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Scaffolding Learning for Undergraduate Action Research Course Participants Using*WhatsApp* Mobile Application

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Abstract: This study investigated the effects of blended instruction strategy through mobile learning (WhatsApp messaging) in a group of undergraduates undergoing the Action Research II course at the English Language Studies Department, Ilmu Khas Institute of Teacher Education, Kuala Lumpur, Malaysia. The study adopted a case study approach where six participants were scaffolded using scaffolding strategies outside classroom time throughout the fourteen weeks of their course. A content analysis was carried out to examine the interaction between the participants and their lecturer. Additionally, a semi-structured interview was conducted to ascertain participants' perceptions about using blended scaffolding strategies through WhatsApp to aid learning. The findings indicate that participants actively participated in the scaffolding process. The scaffolding through WhatsApp also enabled them to carry out their action research better. They also had a positive perception towards the use of mobile learning as opposed to merely learning through chalk and talk in a brick and mortar classroom. The implication of this study is that teacher educators should consider moving away from the traditional brick and mortar classroom alone to technology assisted learning in facing the challenges of the 21st century learning.

Keywords: *blended scaffolding strategies, mobile learning, WhatsApp.*

I. Introduction

The prosperity of a nation in terms of economy and development is much dependent on education. However, the education system in most countries is still short of the 21st century skills. Teaching is dominated by chalk and talk in a brick and mortar classroom. This predicament is not desired as the 21st century workforce needs to be trained and educated according to current trends which are inclined towards technology use to facilitate learning.

One of the ways to move forward in educating the present day post-industrial era learners is through mobile learning. According to West (2013), the 4G/3G wireless connectivity platform is an excellent medium to improve and promote mobile learning. Mobile learning is learning through smartphones and tablets. It allows innovation and facilitates learners, teachers and parents to have access to digital content and personalized assessment. In relation to this, Irwin Jacobs, the founding chairman of Qualcomm, Inc., mentions, "always on, always connected mobile devices in the hands of students has the potential to dramatically improve educational outcomes (ibid). This improvement in educational outcomes is viable because learners can communicate with their teacher and peers outside classroom breaking away from the necessity of having to be present physically. Not only that, mobile technology which is a personalized and ubiquitous learning tool (Mehdipour & Zerehkafi 2013) enables social collaboration between learners, it is highly motivating, encourage problem solving and promotes critical thinking. In a nutshell, mobile technology is an excellent tool to scaffold learning (West, 2013).

The following sections of this paper will centre on explaining scaffolding learning and its importance, online scaffolding to support learning, mobile learning and its benefits, and highlight WhatsApp - a social media used to scaffold learning in this study. Several past studies on using mobile technology to scaffold learning and the present study i.e. Scaffolding Learning for Undergraduate Action Research Course Participants Using WhatsApp mobile application too will be presented.

II. Scaffolding Learning and its Importance

Scaffolding is a term used for the process of assisting a person to carry out a task that is unfamiliar or beyond his/her ability. In the scaffolding process, learners are encouraged to carry out parts of tasks that are within their ability, and the adult helps along or scaffolds the rest (Raymond 2000). The scaffolding process entails moulding the learners' interest and limiting their choices. It is also geared towards focussing learners on

what they are doing, highlighting essential aspects of the task, controlling their disappointment, and displaying activity choices for them (Wood, Bruner, Ross, 1976; Wood & Middleton 1975 in Schwieter 2010). This view of scaffolding propagated by Wood et al. is germinated from Vygotsky's concept of the Zone of Proximal Development (henceforth, ZPD). Vygotsky (1978: 86) defines ZPD as:

Those functions that have not yet matured but are in the process of maturation, functions that will mature tomorrow but are currently in an embryonic state. These functions could be termed 'buds' or 'flowers' of development rather than 'fruits' of development.

From the definition above, Vygotsky (1978) claims that a learner has an actual development level determined by independent problem solving and a potential development level determined by problem solving with the help of an adult or more able peer. This problem solving or help by adults or more able peers, according to Wood et al. (1976) involves a scaffolding process that enables a child or learner to solve a problem, conclude a task or accomplish a target which is not within his/her unaided effort. Agreeing with Wood et al (1976), Holton and Clarke (2006), support Vygotsky's proposition. According to them, a child could be helped to develop his/her ability to a higher level through scaffolds. They juxtapose the scaffolds to the scaffolding metal utilized in construction and repair work. The scaffolds are erected near buildings. They support workers enabling them to reach inaccessible places as they are laying bricks, painting or carrying out repairs. These construction scaffolds can be paralleled to cognitive scaffolds where learners are facilitated by raising the correct questions, prompting, and using tools to assist learning hence allowing new understanding and knowledge building.

According to Holton and Clarke (2006) scaffolding can be divided into two aspects. The first one is agency and the next is domain. There are three agency scaffolds which are: expert scaffolding, reciprocal scaffolding and self-scaffolding. The scaffold provided by a teacher is expert scaffolding. On the other hand, a scaffold provided by a student working in a group either face-to-face or online is reciprocal scaffolding and finally self-scaffolding is when a learner is in a situation where he or she is able to scaffold his/her own self (able to carry out a task on his or her own). Under the domain aspect, there are a further two categories which are conceptual scaffolding and heuristic scaffolding. Scaffolding by the teacher to provide conceptual understanding and development is called conceptual scaffolding. On the other hand, scaffolding provided to find ways to solve a problem in learning is termed heuristic scaffolding. In this study, the three types of agency scaffolds i.e. expert scaffolding, reciprocal scaffolding and self-scaffolding will be utilised as scaffolding strategies to enhance the undergraduate Action Research course participants' ability in carrying out their action research via the use of WhatsApp in a blended learning class.

III. Online Scaffolding to Support Learning

Scaffolding is a teaching strategy laden with the notion that learners confront an educational setting with a great deal of prior knowledge. Some of this knowledge may not be accurate, but the important point is the process of building on what a student already knows make scaffolding an effective instructional technique (Byrnes 2001). Numerous research, points to the fact that human beings approach formal education backed by a variety of schemata or prior knowledge, beliefs, skills and concepts. These beliefs, prior knowledge and concepts greatly influence how one views the world and how one remembers, reasons, and solves problems, and acquire new knowledge (Bransford, Brown and Cocking 2000).

Studies show that online scaffolding supports learning for two reasons. Firstly, online scaffolding positively improves learners' achievement, develops conceptual understanding and also improves writing ability (Zydney 2008; Englert, Wu, & Zhao 2005). Studies too, have shown that success in learning has a positive correlation with careful scaffolding. The scaffold provided by a teacher is able to help solve a problem, complete a task or achieve a learning objective which is beyond the learner's unassisted ability (Bransford, Brown and Cocking 2000).

Another reason for using online scaffolding to support learning is because scaffolding assists the achievement of a successful level of social interaction within an online learning community (Oliver & Herrington 2003). Online scaffolding has to be carried out with non-hierarchical or non-linear learning process. Oliver & Herrington (ibid) stress that to develop a successful learning community; online learning must be strengthened by giving learners appropriate tools to function in the community. Learners in the community have to be able to articulate, discuss and share information among them and the role of the teacher is crucial to achieve success to this end. WhatsApp application therefore, could be used as a mobile online scaffolding tool to support learning.

IV. Mobile Learning and its Benefits

The recognition of the importance and advantages of mobile learning by educational establishments has made mobile learning a normal phenomenon among learners these days. As stated at the onset of this paper, mobile learning permits activities to continue outside the scope of the traditional classroom environment. This can be either a stand-alone mobile program, or a continuity of learning that takes place on a regular desktop computer. With mobile technology becoming inexpensive and internet access extensively accessible, the trend for mobile learning is likely to increase considerably in coming years. The following paragraphs will put-forth several benefits of mobile learning.

One of the benefits of mobile learning is the easy accessibility. Mobile learning as the term suggests, is mobile. There are no hard and fast rules on where it could be implemented. It could be carried out at any time and place. No predetermined place need to be set. Learners have the flexibility of learning at their convenience. Learning can take place anywhere and at any time. Mobile learning allows learning to happen while travelling, during free time, while working, on a holiday or in between busy schedules.

The next benefit of mobile learning is that it is collaborative in nature. Learners living at different locations are able to collaborate with each other. Discussion may be done at any time synchronously despite being very far from each other. Furthermore it is very cost effective due to the inexpensive wireless data plans provided by telecommunication companies. Another benefit of mobile learning is the learner engagement possibility. Mobile learning promotes learner engagement in training. Training at the work place consists of mostly verbal and desktop communication, but adapting mobile learning can bring several opportunities to engage the learner on a digital and social level outside of the work or classroom. Additionally, mobile learning tailors to self-paced learning. No two learners are the same. Each one has his or her way of understanding the content or strategies to learn. With mobile learning, learners are now able to learn in their own style at their own pace. Finally, mobile learning addresses all learning styles. Mobile learning can fit into different learning styles as it allows them to read, to learn through videos, podcast and carry out research through the internet.

V. WHATSAPP– A Social Media

WhatsApp is an instant messaging cross-platform messenger. It can be used in a smartphone that utilizes users' Internet data plan enabling them to network socially in real time. Sending and receiving a variety of media is made possible through WhatsApp. Images, audios and video messages are easily sent through WhatsApp. The software for WhatsApp is available across an array of operating systems such as for Apple iOS, Google Android, Blackberry OS, and Microsoft windows phone, among others (Amry, 2014). WhatsApp Inc. was created in 2009 (Albergotti, MacMillan & Rusli, Evelyn, 2014) by Jan Koum and Brian Acton, both formerly of Yahoo (Eric, 2012). WhatsApp instant messaging handled ten billion messages per day in August 2012 (Olanof, 2012). In June 2013, WhatsApp Inc. announced that they handled 27 billion messages every 24 hours (Sushma, 2012). WhatsApp has over 450 million monthly active users.

Additionally, 700 million photos are shared daily, and 10 billion messages are also shared daily (Parmy, 2013). The WhatsApp software has several features of collaboration. It enables online learners the ability to send and receive text messages, images, videos and audio. All these could be sent to contacts in their phone either personally or in groups. The WhatsApp platform allows creation of groups that can become a social network. This social networking group may be used for learning purposes. Teachers, lecturers and instructors can get engaged with each other in discussions.

VI. Past Studies on Using Mobile Technology to Scaffold Learning

Amry (2014) studied the effects of mobile learning using WhatsApp on the achievements and attitudes of online students in a university using mobile devices. The study was conducted in the academic year 2014. A control experiment design was conducted on 30 participants. 15 participants were placed in the control group and another 15 in the experimental group in a university class. The experimental group went through mobile learning instruction using the WhatsApp application. On the other hand, the control group only received face to face instruction without scaffolding through WhatsApp. Both groups went through the same learning unit and the findings of the experiment showed a significant positive achievement in the experimental group. The results of the experiment showed that there are real differences, at 0.05 alpha level, in the achievements and attitudes of the experimental group compared with the control group. This is a clear evidence of the benefits of mobile scaffolding through WhatsApp given to participants in the experimental group.

Another two successful studies using mobile application is worth to be noted. The first one is a study on improving vocabulary development among young learners. In this study, students aged between three and seven were taught vocabulary using a mobile application called Martha Speaks Dog Party. The findings of the study indicate that upon using the mobile application for three weeks, their vocabulary improved by a marked 31 percent. In another study at Abilene Christian University, students in a statistics class went through a period of mobile learning using the mobile Statistics 1 application. The study revealed a remarkable increase of performance in students. Students also reported that they understood the content taught much better.

Additionally, they also cited a higher level of motivation towards the subject. Their instructors also reported that the students were better prepared for class (Mehdipour & Zerehkafi 2013).

VII. The Present Study

The present study was carried out at Ilmu Khas Institute of Teacher Education, Kuala Lumpur, Malaysia. Six participants were selected among 83 final year undergraduates undergoing the Action Research II subject. Prior to this, in the earlier semester, they had undergone the Action Research I methodology subject during which they had come up with a research proposal to be implemented during the Action Research II stint.

The course participants were students in the TESL degree programme. They went through six hours of mass lectures and an additional three hours of tutorial time each week. All these were done through the face-to-face mode. The typical teaching and learning style was delivery of lectures and tutorial tasks presented during tutorial sessions.

Alternatively, the six participants comprising two females and four males in this study were made to indulge in mobile learning. Their learning was scaffolded through smartphones using the WhatsApp messaging application. Although there are other social media applications, WhatsApp was chosen because most students are familiar with and use this application. The reason for the selection of these particular six participants was solely based on the convenience sampling. Convenience sampling is fast, readily available, and cost effective. In this case, the researcher used his six supervisees for the Action Research II course. Additionally, this sampling method is useful in getting general ideas about the phenomenon of interest (Creswell, 2013).

The six participants were enrolled into a group called the AR Scaffolding. The researcher was the group administrator. Prior to the inception of the group, all participants were reminded about rules and ethics of the group. Among others, they were reminded not to post any derogatory remarks and not to share any personal issues in the group. The researcher created this group solely to scaffold the action research subject teaching and learning and the process of carrying out the research throughout the semester. Group members were also reminded about academic decorum.

Before embarking on the mobile learning experience, the researcher took time to explain the scaffolding techniques to be used in the group. The three scaffolding techniques used in the research were the expert scaffolding, reciprocal scaffolding and, self-scaffolding. The researcher himself was the expert scaffolder. Expert scaffolding is done by the teacher in most of the teaching and learning situations. Reciprocal scaffolding is done by course participants to clarify learning content among themselves. Self-scaffolding is when the learners are able to scaffold their own self (able to carry out a task on their own). In fact, at this stage, learners are able to become expert scaffolders themselves. To get acquainted with the scaffolding techniques, participants were given a session of training to illustrate examples of expert, reciprocal and self-scaffolding. At the end of the fourteen weeks, a content analysis was carried out to examine the interaction between the participants and their lecturer. Additionally, participants were asked: (1) Do you think the mobile scaffolding through WhatsApp had helped you to carry out your action research? If yes, how? (2) To what extent is the mobile scaffolding through WhatsApp beneficial to your learning?

VIII. Results

The following section will put forth the findings which are divided into two sections: the interaction between the participants and their lecturer, and the ability of mobile scaffolding through WhatsAppto help participants carry out their action research and benefit their learning.

A. Interaction between the participants and their lecturer.

Whether teaching and learning takes place in the classroom face-to-face or it happens virtually through e-learning or mobile learning, the more pertinent issue is the pedagogy and methodology used by the teacher. Otherwise, all these will be merely not useful tools. Thus, in order to maximise the effectiveness of the mobile learning experience through WhatsApp, three scaffolding strategies were used i.e. the expert scaffolding, reciprocal scaffolding and the self-scaffolding. These are examples of each scaffolding types from the Whatsapp interaction. The responses are verbatim.

i. Expert scaffolding

Instructor : Good evening everyone. How has the day been?
Participant 1 : Hi Sir! Great!
Participant 2 : Good Sir. How about you?
Participant 3 : Interesting sir.
Instructor : Well, not bad.
Instructor : Remember the Action Research models I discussed today? Any problems with them?
Participant 4 : Sir, the models….. I think they are all about the same.

Instructor : Are you sure? Why do you say that? They look the same but there are differences……Look carefully.
Participant 1 : Sir, One of the models looks different.
Instructor : That was what I said. They look the same but there are differences. Ok… Now, I want you people to put your heads together and discuss. I will just observe….
ii. Reciprocal scaffolding
Participant 1 : Dr Hameed showed us the difference just now. The ……. model is different.
Participant 4: I know. But I am not very clear.
Participant 6 : I understand but I don't know how to say…
Participant 5 : The model. He he he….He said got new idea from the cycle……
Instructor : Good! What about the new idea? Someone explain…
Participant 1: I think lah……the McNiff model, as you are doing the cycle if you find new problem you can examine it.
Instructor : There you see…. The difference is coming out. So, can you say all the models are same?
iii.Self-scaffolding
Participant 1: Sir, is it right if I say this……' In McNiff's model, the process need not be in sequence or necessarily rational. It is possible to begin at one place and end up somewhere entirely unexpected. It is an iterative spiral of spirals sir. If I am not mistaken, it is possible to address multiple issues while still maintaining a focus on one (The participant has become expert himself and be able to scaffold his peers).
Instructor : Great! That is very true. You are very clear about it. Perhaps you can explain that to your friends.

B. Participants found that mobile scaffolding through WhatsApp helped them in carrying out their action research and learning.

All the participants in the group opined that the mobile learning carried out through WhatsApp tremendously helped them in their pursuit of the action research course. They felt that it gave them the opportunity to participate in the learning at any time even while away from the class. They could get clarifications not only from their lecturer but also from their friends. They went through the course with little stress compared to their peers who only had face-to-face learning. These are examples of participants' responses:
Participant 1 : I felt little stress compared to my friends who did not have this WhatsApp learning group.
Participant 2 : Each time I had a confusion, I just texted my lecturer. I did not have to wait to see him.
Participant 3 : I am usually shy to ask questions. So I keep quiet. But this group WhatsApp helped me. I just observe the chats and I understand. Sometime I text my friend in the group personally and ask. This was very helpful.
Participant 5: The lecturer got us to think and help each other. I always ask my friends for clarifications. Sometimes when friends explain, I feel not so stressed. Friends in the group help us understand things better.
Participant 4 : ….mm…. I can get help even during weekend and at night. There was one day I was sick. Still could ask questions and help each other.
Participant 6 : ….arr…Well sir, I just bring my phone. No need for lap top. Bulky. My classroom is in my pocket…(smiles).
Participant 1 : Sir, this group made me know the process of doing my action research easily. Every time I had questions I just WhatsApp you. Even my friends also reply. This saved a lot of time. My friends always have to wait for class time to ask questions.
Participant 2 : We were in school for three months. We were having our practicum. Very hard to come to college. Through our group, I could carry on with my research without wasting time. The process was smoother sir.

IX. Discussion of Findings and Implications

In the discussion of the past studies using mobile learning which was presented earlier, three studies were presented. The first study by Amry (2014) to ascertain the achievements and attitudes on learning using WhatsApp, found that there are significant differences in achievement between students who studied using mobile leaning compared to those learning only in the face-to-face class. The other study on improving vocabulary using the mobile application Martha Speaks Dog Party too, indicate that upon using the mobile application for three weeks, learners' vocabulary improved by a marked 31 percent. In the third study which was conducted at Abilene Christian University, on students in a statistics class learning using the mobile application Statistics 1 also revealed a remarkably increased results in their performance. Not only that, students felt more motivated and reported more understanding of the subject. These findings are in tandem with the findings of the present study. The present study's findings will be discussed according to three areas i.e. the

ability of the mobile learning to scaffold learning, the ability of the mobile learning to make learning less stressful, and the ability of the mobile learning to make learning possible anywhere and anytime.

As for the ability of mobile learning to scaffold learning, participant 5 mentioned: The lecturer got us to think and help each other. I always ask my friends for clarifications. Sometimes when friends explain, I feel not so stressed. Friends in the group help us understand things better. The conclusion that can be drawn from this response is that the scaffolding strategies used through WhatsApp in the mobile learning was successful in helping participants in understanding their course content with help from their lecturer and group members. Another interesting finding worth noting is the participants' differences in personality which has bearing on learning. Participant 3 for instance, mentioned: I am usually shy to ask questions. So I keep quiet. But this group WhatsApp helped me. I just observe the chats and I understand. Sometimes I text my friend in the group personally and ask. This was very helpful. This finding is in agreement with the findings of Abdul Hameed Abdul Majid (2012a & b) where he found teaching and learning using ICT (Information and Communication Technology) to be beneficial in mediating and supporting learner differences.

X. Conclusion

This study investigated the scaffolding of learning using WhatsApp among undergraduate action research course participants at Ilmu Khas Teacher Training Institute, Kuala Lumpur, Malaysia. The scaffoldings i.e. the expert scaffolding, reciprocal scaffolding and the self-scaffolding were done through WhatsApp mobile application. Similar to several past studies, this study too, has proven that mobile learning can create a community of learners who can help each other. Knowledge could be shared anywhere and anytime through this ubiquitous learning platform. The content analysis of the chats found that interactions between participants and their lecturer helped them carry out their action research and benefitted their learning. All the participants in the group opined that the mobile learning carried out through WhatsApp tremendously helped them in their pursuit of the action research course. The mobile learning experience gave them the opportunity to participate in learning at any time even while away from the class. They felt less threatened and less stressed throughout the course compared to their peers who only went through the traditional brick and mortar learning. Thus, policy makers should put all possible effort to embrace mobile technology in view of transforming learning which is very much necessary to face the challenges of the 21st century.

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